Personal Protective Equipment

DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health

Welcome and Introductions

WELCOME !!!

Introductions

Housekeeping:

Restrooms, Breaks, Food, Cell Phones, Fire Exits

Course Goal

The goal of today's course is for each individual to be able to protect themselves in an all-hazards emergency event.

Course Objectives

- Become aware of the types of emergencies that may require the use of Personal Protective Equipment (PPE).
- Identify the various levels of PPE and types of respirators.
- Identify key points of use and limitations of PPE.

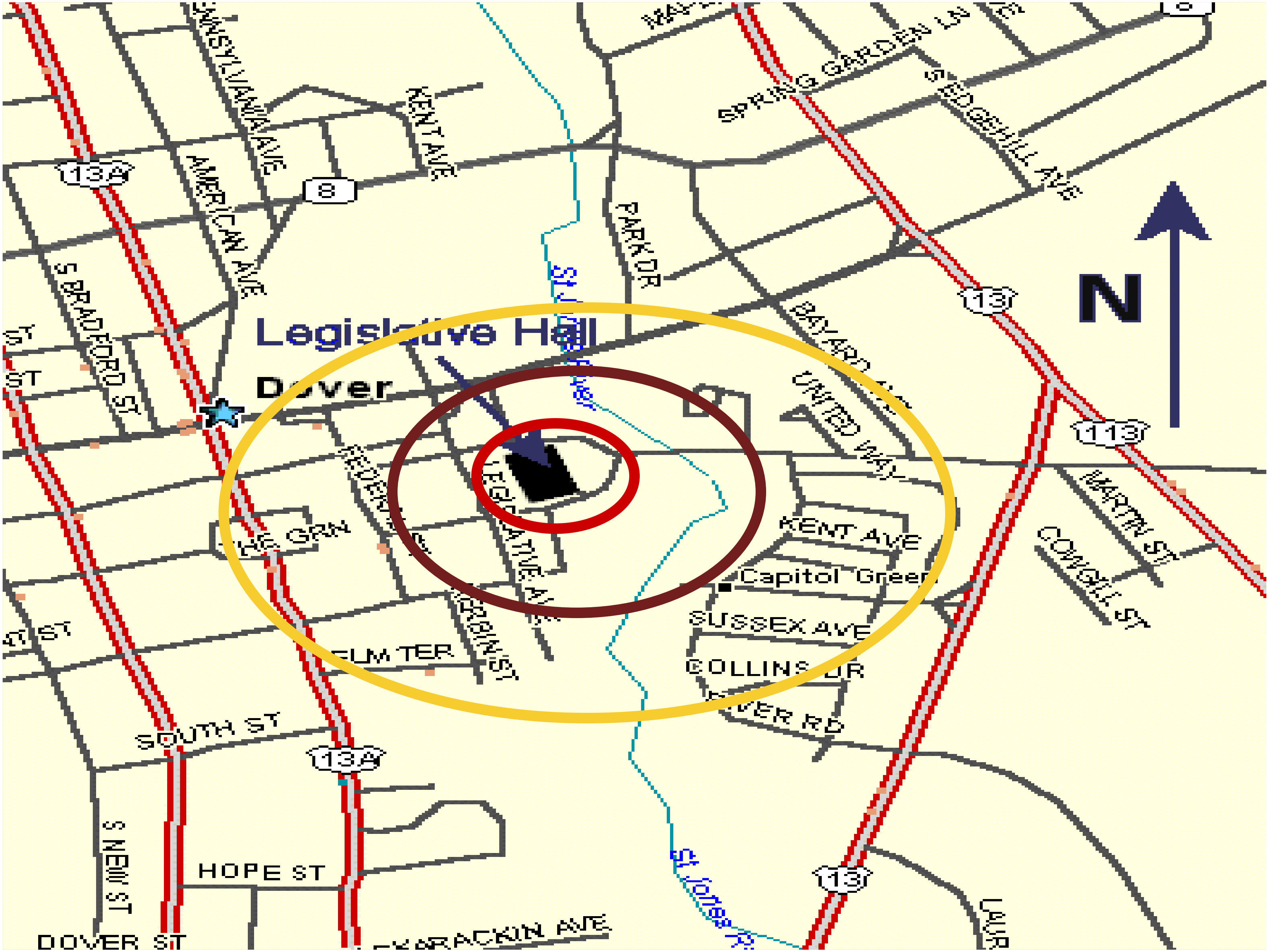
Course Objectives

- Describe the Protective Action Zones of incident response and decontamination.
- Discuss the requirements of a Personal Protective Equipment Program.

Scenario- Legislative Hall, Dover

At 08:35 this morning we were notified by Dover Police that there had been an explosion resulting in victims down at Legislative Hall, Dover. Police report that there are many people down, as well as some injured who seem to be having difficulty with their breathing.

What could it be?


Legislative Hall
Dover
N
Capitol Green
KENT AVE
SUSSEX AVE
COLLINS DR
BAYARD AVE
UNITED WAY
PARK DR
SPRING GARDEN LN
S EDGEHILL AVE
MARTIN ST
COWGILL ST
AMERICAN AVE
S BRADFORD ST
SOUTH ST
HOPE ST
S NEW ST
DOVER ST
ELM TER
13A
13
113
8

Hazardous Agents

Emergency personnel may be required to assist or provide care to victims of a natural or technological CBR incident.

- Identification of hazardous agents is of utmost importance.
- Emergency response personnel should avoid secondary contamination.

Hazardous Agents

Chemical

Biological

Radiological

Chemical Agents

AGENT NAME
BASED ON
SYMPTOMS
PRODUCED

NERVE AGENT
BLISTER AGENT
CHOKING AGENT
BLOOD AGENT

Chemical Agents

Agent	Breathing	Skin
NERVE	YES	YES
BLISTER	YES	YES
CHOKING	YES	YES *
BLOOD	YES	YES *

Protection from Chemical Agents

- Respiratory and skin protection is recommended for emergency response personnel.
- Protective Equipment is recommended until decontamination is complete.
- In general, a lower level of protective equipment is used when the inhalation risk is known to be below levels expected to harm personnel.

Biological Agents

Anthrax
Affects skin and lungs

Smallpox
Eradicated in 1977
Highly Infective
Mortality Rate of 30%

Viral Hemorrhagic Fevers
Ebola mortality rate of 90%
Marburg mortality rate of 60%

Avian Influenza

Protection Against Biological Agents

- Respiratory protection is recommended for biological hazards.
- Generally, biological agents are not absorbed through unbroken skin.
- Contact hazard due to transfer.
- Exception: Mycotoxins, which act like chemical agents.

Biological Agent Hazards

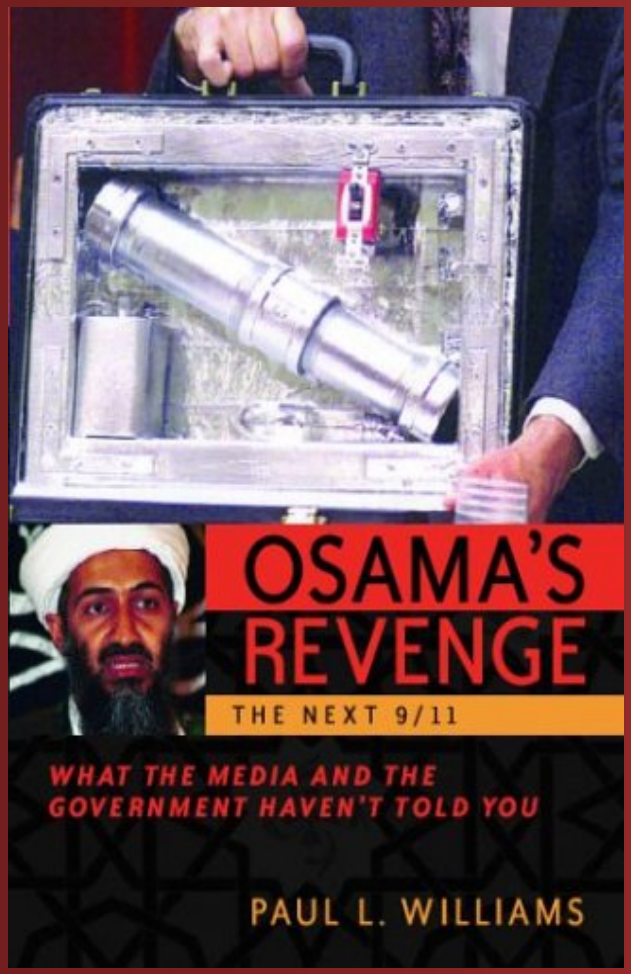
Protective clothing and a respirator are recommended for personnel performing decontamination procedures.

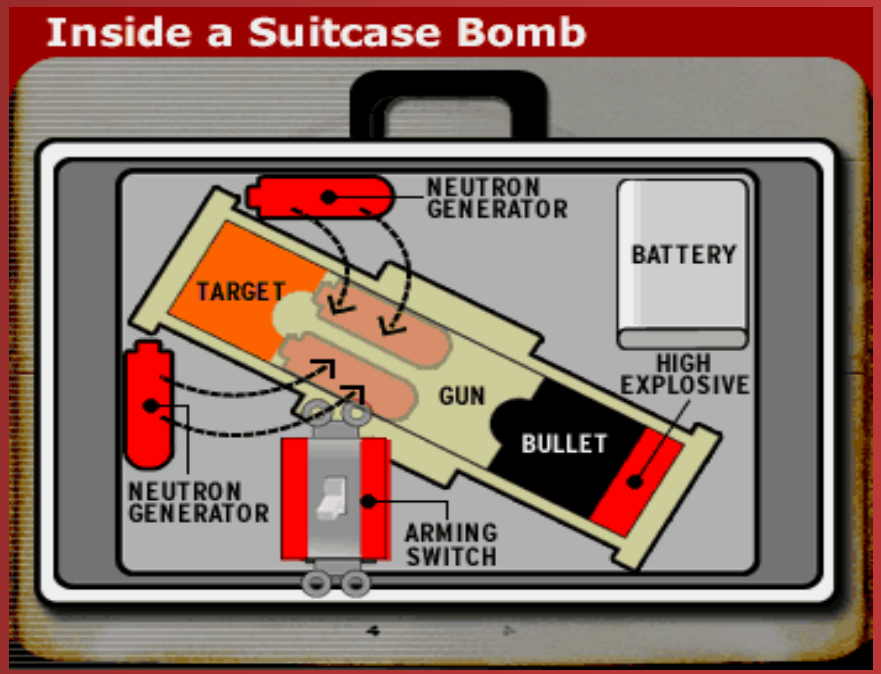
Hospital infection control procedures.

Radiological Hazards

- Radioactive material from:
  - Nuclear weapons
  - Nuclear power plant waste
  - Radiation sources used in industry
- Possible internal and external hazard

Nuclear Bomb





Nuclear Reactor Incidents

Chernobyl Nuclear Power Plant

Ukraine -April 25, 1986

- By May 2, 1986 - 31 dead
- By CY 2000 - 8,000 dead, 40,000 injured
- Massive Contamination – 326,000 people relocated
- $12.8 billion disruption to Soviet economy
- Detectable radiation circled the globe

Radioactive Decay

- **Alpha** Particles/Emitters – Stopped by **Paper**
- **Beta** Particles/Emitters – Stopped by **Clothing**
- **Gamma** Photons/ Emitters – Stopped by thick **Lead**
- **All** pose a serious INTERNAL Hazard – **Carcinogen**

Protection from Radiological Agents

- When victims are contaminated with radioactive material, respirators and other protective equipment are recommended until decontamination is complete.
- Double layers of gloves and frequent changes help reduce the spread of radioactive material.

Personal Protective Equipment Levels

- The PHPS S.O.G. uses the levels of protection identified in *Title 29 of the Code of Federal Regulations (CFR) 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER).*
- The levels of PPE are Levels A, B, C, and D, with Level A being the maximum protection level.

PPE Levels – A to D – High to Low

A

B

C

D

Level **A** Protective Equipment

- Level A - when the greatest level of skin, respiratory and eye protection is required.
- "Unknown" agent - Level A PPE is worn unless otherwise determined by the Incident Commander based on the event.

Level **A** Protective Equipment

- Positive-pressure, full face piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA *(NIOSH Approved)*
- Totally encapsulated chemical and vapor protective suit (impermeable material).
- Chemical resistant inner and outer gloves.

Level **A** Protective Equipment

- Disposable protective suit, gloves and boots may be worn.
- A general rule of thumb for chemical protective boots is that they should be two sizes larger than normal footwear.

Level **B** Protective Equipment

- Level B PPE is required when the highest level of respiratory protection with a lower level of skin protection is needed.
- Positive-pressure, full face piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator (SAR) with escape SCBA *(NIOSH Approved).*

Level **B** Protective Equipment

- Under-clothing: Chemical resistant overalls and long-sleeved jacket or disposable chemical resistant coveralls.
- Over-clothing: Hooded two-piece chemical splash suit or hooded chemical resistant clothing (coveralls) made of impermeable material.

Level **B** Protective Equipment

- Chemical resistant inner and outer gloves.
- Face shield.
- Outer chemical resistant boots.

Level **C** Protective Equipment

- **Level C** protection – when concentration and type of airborne substance is known and the criteria for using air purifying respirators are met.

- **Note:** The difference between **Level C** and **Level B** is the type of equipment used to protect the **respiratory system.**

Level **C** Protective Equipment

- Full or half face mask with air purifying respirator (APR) or (PAPR) with appropriate Cartridges.

- Chemical resistant clothing: Such as one piece coverall, hooded two piece chemical splash suit, chemical resistant hood and apron or disposable chemical resistant coveralls.

Level **C** Protective Equipment

- Inner and outer chemical resistant gloves.
- Escape mask (optional).

Level **D** Protective Equipment

- Level D protection is the minimum protection required.
- Level D protection may be sufficient when no known contaminants are present.

Level **D** Protective Equipment

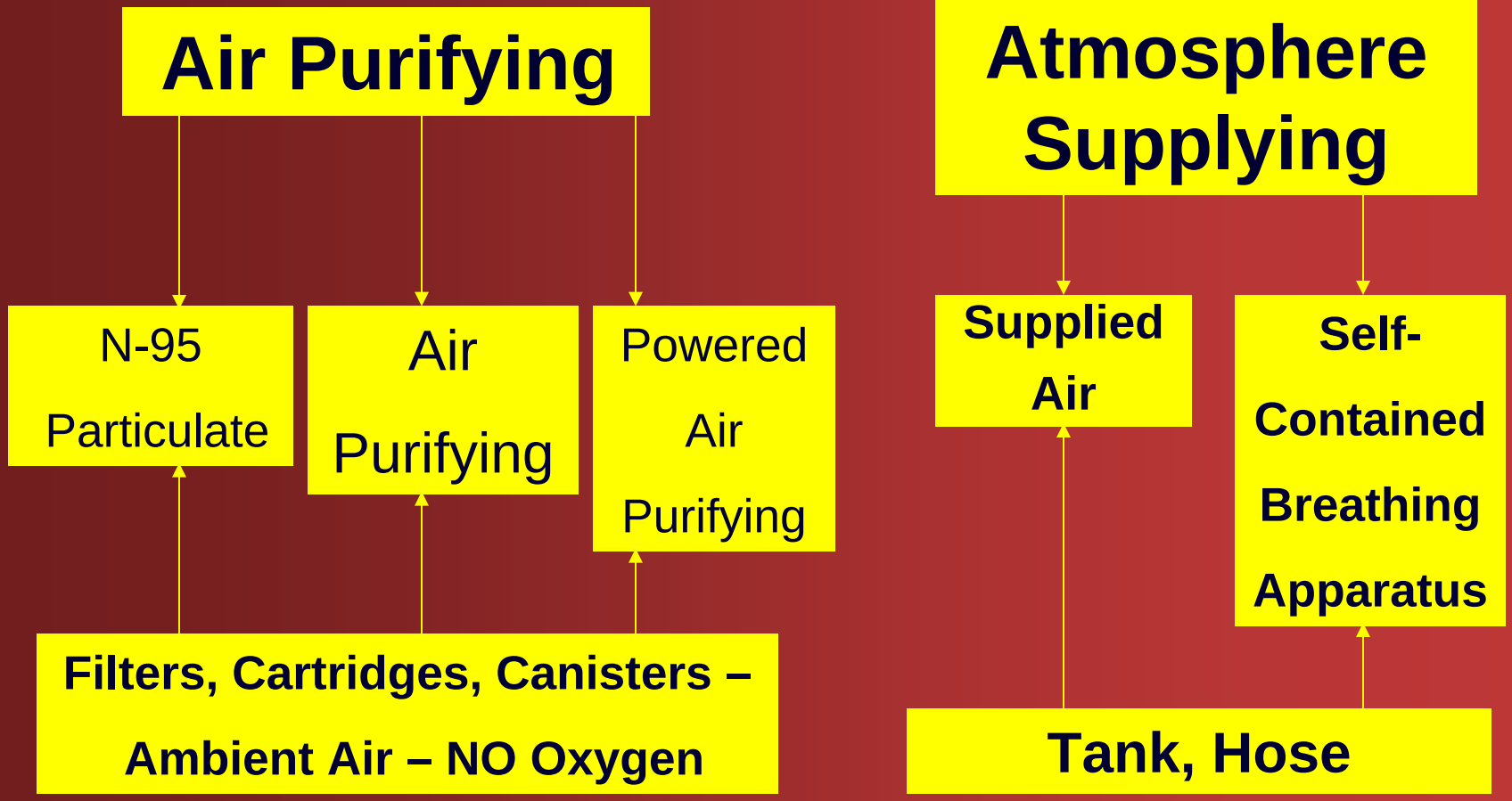
- Usually standard work clothes.
- N-95 Particulate Respirator.
- Gloves.
- Shoes / Boots.
- Hospital workers may require additional protective equipment for Contact, Droplet, and Airborne Precautions

B R E A K !

Start again in

15 Minutes

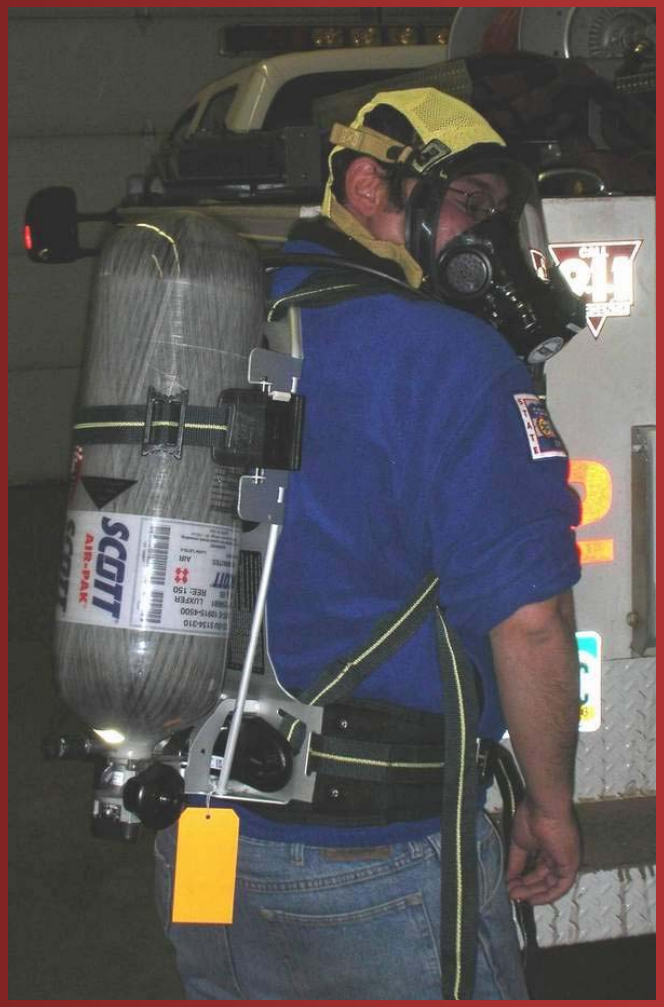
RESPIRATOR TYPES



Powered Air Purifying Respirator (PAPR)

Supplied Air Respirators

Self Contained Breathing Apparatus (SCBA)



Warning Signs of Respirator Failure

Report to supervisor if:

- Breathing difficulty
- Unusual smells
- Any agent symptom

Disposable respirators should be discarded

Use and Limitations

- A person's medical condition can also limit the use of PPE.
- Environmental conditions such as heat and cold can affect both the performance of the PPE and the user in his or her ability to tolerate PPE use.

Maintenance and Storage

PPE should be stored to prevent damage or malfunction from exposure to dust, moisture, sunlight, chemicals, impact, and extreme temperatures.

The Shelf-life of PPE

- The shelf-life of PPE as recommended by manufacturer.
- The “expiration date” of the PPE should be clearly marked while the PPE is in storage.

Protective Action Zones

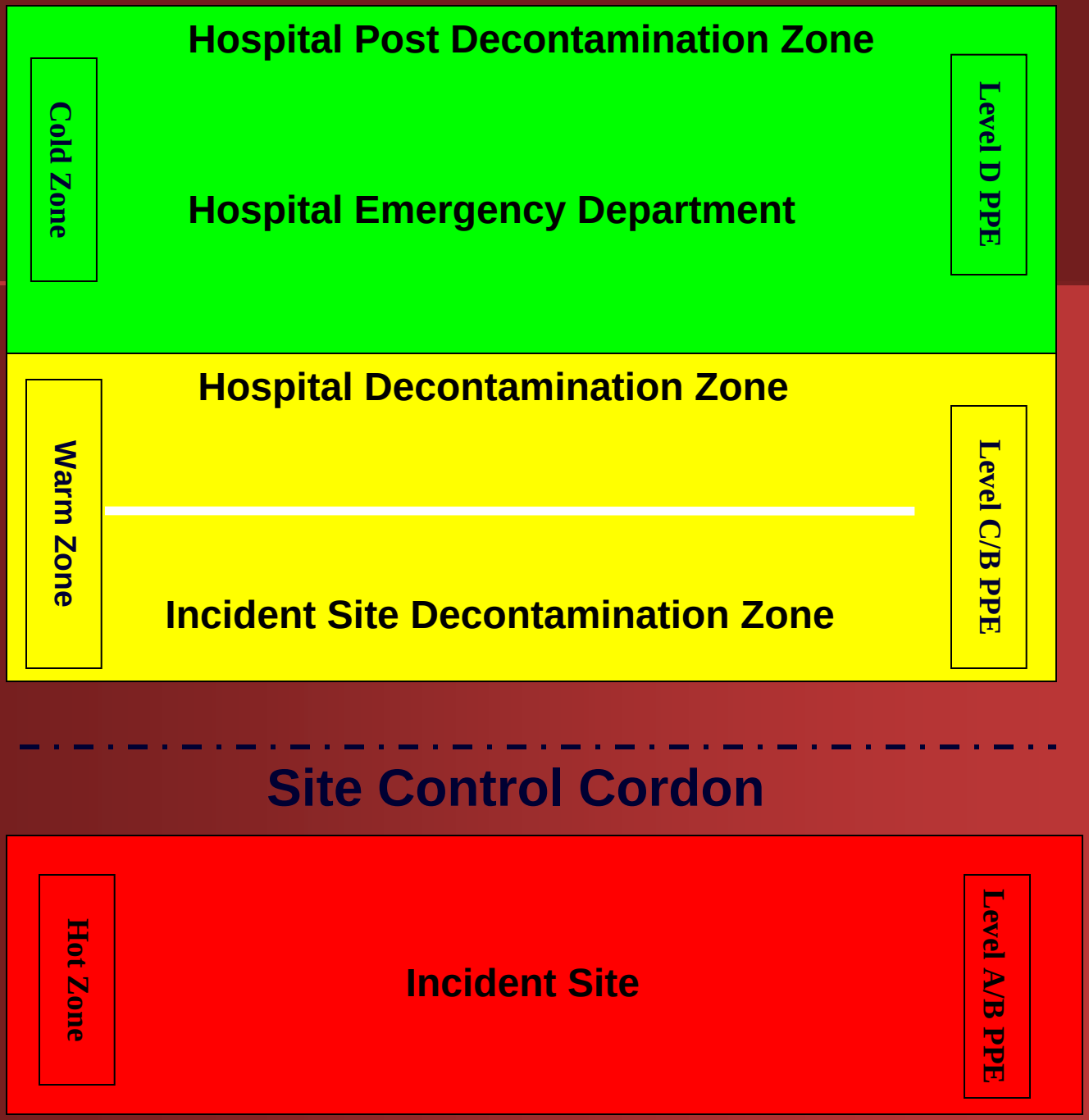
The Protective Action Zones for the purpose of this guide are divided into two site control areas, **Incident Site** and **Hospital Site**.

Each site control area is further divided into three (3) zones:

- **Hot, Warm, Cold**
- Based on Contamination

Protective Action Zones

- **Hot zone** denoting a contaminated area where adverse effects might be seen.
- **Warm zone** being an area for close support and decontamination.
- **Cold zone** representing an area with no potential exposure.


Hospital Post Decontamination Zone
Cold Zone
Level D PPE
Hospital Emergency Department
Hospital Decontamination Zone
Warm Zone
Level C/B PPE
Incident Site Decontamination Zone
Site Control Cordon
Hot Zone
Incident Site
Level A/B PPE

Hospital Site

Hospital Site:

Efforts should be taken by the hospital staff to recognize symptoms and initiate patient decontamination.

Decontamination

Decontamination is the process by which particulate, vapor, liquid or solid materials are safely removed from an exposed victim without further contaminating:

- The casualty,
- The environment,
- The emergency responder.

The Goals of Decontamination

- Remove the contaminated clothing and agent from the victim's skin.
- Protect emergency responders and medical personnel from secondary exposures.
- Provide victims with psychological comfort at, or near the incident site.
- Facilitate treatment and triage.

Decontamination

- Basic decontamination procedures are generally the same no matter what the agent.
- Thorough scrubbing with large amounts of lukewarm soapy water (preferred method).
- Or a mixture of 9 parts water to 1 part bleach (9:1).

Respiratory Protection Program

Components:

- Medical Evaluation
- Fit Testing
- Issuance
- Record Keeping
- Training
- Individual Responsibilities

Medical Evaluations (29 CFR 1910.134 App C (Mandatory))

- A physician or other licensed healthcare professional (PLHCP), make the determination if an individual is medically fit to wear a respirator.
- All examinations and questionnaires are confidential per HIPPA rules.

Respirator FIT Testing (29 CFR 1910-134 (f) (Mandatory))

- A fit test must be used to ensure a satisfactory fit with any negative or positive pressure tight-fitting face piece.
- Quantitative or qualitative fit tests should be performed prior to issue of any respirator.

Issuance of Respirators

- Fit test before ordering, purchasing, or issuing the respirator.
- Emergency response personnel should be placed into the Respiratory Protection Program before being issued equipment.

Record Keeping

- The Respiratory Protection Program Administrator for each response agency should document and maintain record of Personal Protective Equipment training to include:
  - Type and level of PPE ,
  - Method of training,
  - Date and the name of the instructor.

- Records should be maintained by individual response agencies.

Training

- The proper use of any type of PPE requires adequate training.
- Appropriate training topics include:
  - Hazard identification.
  - Medical monitoring.
  - Environmental surveillance.
- Selection, use, maintenance, and decontamination of PPE.

Responsibilities of Respirator Wearers

- Each respirator wearer must wear their respirator in the manner in which they were trained.
- Report any malfunctions of the respirator to their supervisor and the RPPA immediately.
- Guard against mechanical damage to the respirator, clean the respirator as instructed, and store the respirator in a clean, sanitary location.
- Responsible for care, maintenance, and storage of respirators.

Summary

- Discussed the types of emergencies that may require the use of PPE.
- Identified the various Levels of PPE and Types of Respirators.
- Identified Key points of use and limitations of respirators.

Summary

- Described the Protective Action Zones of Incident Response and Hospital Decontamination.
- Discussed the requirements of a Personal Protective Equipment Program.

Thank You!

Pan Flu Kits

Essential Workers

20,000 Kits – Distribution Pending – Agency Distribution

Contents:

1. Disinfecting Wipes (35)
2. 5 each: N–95 Respirators
3. 4 oz Hand Sanitizer
4. Pocket Guide to PPE
5. Forehead Thermometer
6. Prepare a Kit – Flyer
7. Pandemic Influenza Guide for Families
8. Radiological Dispersal Device Guide
9. 5 each: Face Shields

Pan Flu Kits

- General Population
- 5,000 Kits – Distribution Pending

Contents:

1. Disinfecting Wipes (35)
2. 1 N–95 Respirators
3. 4 oz Hand Sanitizer
4. Forehead Thermometer
5. Prepare a Kit – Flyer
6. Pandemic Influenza Guide for Families
7. 1 Face Shield
8. Disability Wheel